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EXAMINER
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SHUMATE, ANTHONY R

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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05/24/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,649	<b>Applicant(s)</b> CALUNDANN ET AL.	
	<b>Examiner</b> ANTHONY SHUMATE	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2010 and 09 February 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27, 29 and 31-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-22, 26, 27, 29, 31 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-25, 33 and 34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The Amendment filed 11 February 2010 has been entered and fully considered.
2. Claims 1-27, 29, and 31-34 are pending, of which claims 1-27, 29, and 31-33 were amended, and claim 34 is new. Claims 1-22, 26, 27, 29, 31 and 32 are withdrawn from consideration as being directed to a non-elected invention. Claims 23-25 and 33, 34 were fully considered.
3. The previous specification objection is withdrawn in light of Applicant's amendment to the specification.
4. The previous claim objection of claim 4 is withdrawn in light of restriction.
5. The previous 35 USC 112 rejection of claim 30 is withdrawn in light of Applicant's amendments to the claims.
6. The previous 35 USC 112 rejection of claims 10, 12, 18, 19, 24, 27, 29, 30, 31 and 32 is withdrawn in light of restriction.
7. The previous 35 U.S.C. 102(a) rejection in relation to CALUNDANN et al. (DE 10117686) ("CALUNDANN686") is withdrawn in light of Applicant's submission of a translation of the foreign priority document.
8. The previous 35 U.S.C. 103(a) rejections of claims 11, 14, 16, 17, 31 are withdrawn in light of restriction.

### ***Election/Restrictions***

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9. Newly submitted claims 1-22, 26, 27, 29, 31 and 32 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 1-22, 26, 27, 29, 31 and 32 are drawn to a method of producing a proton-conducting polymer membrane, when no method of producing a proton-conducting polymer membrane was originally presented. The method is a different statutory class than the apparatus and therefore independent and/or distinct from the invention originally claimed.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-22, 26, 27, 29, 31 and 32 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

As well, MPEP 819 states...

**819 [R-3] Office Generally Does Not Permit Shift**

The general policy of the Office is not to permit the applicant to shift to claiming another invention after an election is once made and action given on the elected subject matter.

***Information Disclosure Statement***

10. Any foreign language documents submitted by applicant has been considered only to the extent of the short explanation of significance, English abstract or English equivalent, if appropriate.

11. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

***Claim Rejections - 35 USC § 101***

12. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

***Claim Rejections - 35 USC § 112***

13. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claim 23-25 and 33, 34 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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The phrase of step A, "wherein the phosphoric acid does not contain any polyphosphoric acid" of claims 23-25 and 33, 34 is not supported by the original disclosure.

The instant specification states, "The phosphoric acid used in step A) is a commercial phosphoric acid as can be obtained, for example, from Riedel-de Haen. It is preferably a concentrated phosphoric acid  $\text{H}_3\text{PO}_4$  which usually has a concentration of 85%. More highly concentrated phosphoric acids are also possible, but these contain no polyphosphoric acids  $\text{H}_{n+2}\text{P}_n\text{O}_{3n+1}$  ( $n \geq 2$ ).". This does not state the preferred concentrated phosphoric acid  $\text{H}_3\text{PO}_4$  of 85% contains no polyphosphoric acids  $\text{H}_{n+2}\text{P}_n\text{O}_{3n+1}$  ( $n \geq 2$ ).

The instant specification states, "More highly concentrated phosphoric acids are also possible, but these contain no polyphosphoric acids  $\text{H}_{n+2}\text{P}_n\text{O}_{3n+1}$  ( $n \geq 2$ ).", therefore based on the instant specification concentrated phosphoric acids above 85% contain no polyphosphoric acids  $\text{H}_{n+2}\text{P}_n\text{O}_{3n+1}$  ( $n \geq 2$ ).

15. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

16. Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 33 provides for the use of the polymer film, but, since the claim does not set forth any steps involved in the method/process, it is unclear what

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method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 33 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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17. Claims 23, 24 and 34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 39, and 40 of U.S. Patent No. 7,384,552 B2 ("CALUNDANN552") in view of KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) ("KIRK").

Although the conflicting claims are not identical, they are not patentably distinct from each other because a person of ordinary skill in the art would conclude that the membrane as recited in the instant application claims clearly envisage the membrane of the patent because the copending application also claims proton-conducting polymer based on polyazoles which is obtained by a process.

Instant claim 34 is described at claim 39, A) mixing of one or more aromatic tetramino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution and/or dispersion, B) heating of the mixture (i.e. solution and/or dispersion) obtained in step A) to temperatures of up to 350 °C. to form the polyazole polymer, C) application of a layer using the mixture from step B) to a support, D) treatment of the layer (membrane) formed in step C).



In relation to the phrase, “wherein the phosphoric acid does not contain any polyphosphoric acid.” KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph “Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present.”

It would have been obvious to one having ordinary skill in the art at the time invention was made to simply substitute the polyphosphoric acid of CALUNDANN552 with the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, or alternatively based on the reasonable expectation that structurally similar species usually have similar properties. (MPEP 2144.07) Also see KSR.

Instant claim 23, and 24 is described at claim 40.

18. Claims 24 and 34 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 20 of U.S. Patent No. 7,582,210 B2 (“CALUNDANN210”) in view of KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) (“KIRK”).

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Although the conflicting claims are not identical, they are not patentably distinct from each other because a person of ordinary skill in the art would conclude that the structure as recited in the instant application claims clearly envisages the structure of the U.S. Patent No. 7, 582,210 B2 claims.

In relation to the phrase, “wherein the phosphoric acid does not contain any polyphosphoric acid.” KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph “Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present.”

It would have been obvious to one having ordinary skill in the art at the time invention was made to simply substitute the polyphosphoric acid of CALUNDANN210 with the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, or alternatively based on the reasonable expectation that structurally similar species usually have similar properties. (MPEP 2144.07) Also see KSR.

Instant claims 24 and 34 is sufficiently described at claim 20.

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19. Claims 24 and 34 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,540,984 B2 ("CALUNDANN984") in view of KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) ("KIRK").

Although the conflicting claims are not identical, they are not patentably distinct from each other because a person of ordinary skill in the art would conclude that the structure as recited in the instant application claims clearly envisages the product of the process of the U.S. Patent No. 7,540,984 B2 claim(s).

Instant claim 24 and 34 is described at claim 1, A) mixing of one or more aromatic tetramino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic and/or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution and/or dispersion,

B) heating of the mixture (i.e. solution and/or dispersion) obtained in step A) to temperatures of up to 350 °C. to form the polyazole polymer,

C) application of a layer using the polymer (i.e. mixture) from step B) to a support,

D) treatment of the membrane formed in step C).

In relation to the phrase, “wherein the phosphoric acid does not contain any polyphosphoric acid.” KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph “Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present.”

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK with the process of CALUNDANN984, since the process of CALUNDANN984 uses phosphoric acid, or alternatively since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, or alternatively based on the reasonable expectation that structurally similar species usually have similar properties. (MPEP 2144.07) Also see KSR.

### ***Claim Rejections - 35 USC § 102***

20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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21. Claims 24, 25 and 34 rejected under 35 U.S.C. 102(b) as being anticipated by CHOE (US 4,312,976) or, in the alternative, under 35 U.S.C. 103(a) as obvious over CHOE (US 4,312,976) in view of KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) ("KIRK").

For instant claims 24, 25 and 34, CHOE teaches at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28 mixing 3,3',4,4'-tetraaminobiphenyl (aromatic tetraamino compound) with isophthalic acid (aromatic dicarboxylic acid) and conducting the polymerization with phosphoric acid to form a dispersion.

Inherently, the phosphoric acid of CHOE does not contain any polyphosphoric acid, since CHOE does not describe at column 7 lines 27-47 and example 1 the addition of polyphosphoric acid.

In the alternative, KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph "Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present."

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK with the product of CHOE, since CHOE teaches at column 7 lines 27-47 and example 1 the process

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using phosphoric acid, or alternatively since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, or alternatively based on the reasonable expectation that structurally similar species usually have similar properties. (MPEP 2144.07) Also see KSR.

Also for instant claims 24, 25 and 34, CHOE teaches at column 6 lines 20-26 heating the dispersion at a temperature of within the range of approximately 340 °C to 450 °C to form polybenzimidazole (polyazole polymer). The range of approximately 340 °C to 450 °C overlaps the claimed range of up to 350 °C.

In the alternative, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, see ***In re Malagari*, 182 U.S.P.Q. 549; *In re Wertheim* 191 USPQ 90 (CCPA 1976).**

Plus for instant claims 24, 25 and 34, CHOE teaches at column 8 line 35-40 that the polymer of the invention can be employed as a film.

As well, CHOE teaches at example 1 the resulting product was cooled to room temperature (treatment of the membrane formed in step C)).

In relation, MPEP 2113 describes the following...

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

MPEP 2113 states...

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)

***Claim Rejections - 35 USC § 103***

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22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 24 and 34 rejected under 35 U.S.C. 103(a) as being unpatentable over SHERATTE (US 4,154,919) in view of CHOE (US 4,312,976), or, in the alternative, under 35 U.S.C. 103(a) as obvious over SHERATTE (US 4,154,919) in view of CHOE (US 4,312,976) and KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) ("KIRK").

For instant claims 24 and 34, SHERATTE teaches at the abstract, table 1, column 6 lines 54-57, column 9 lines 20-45 and example 5 mixing an N,N'-bis (2-aminophenyl)-4,4' diamino-diphenyl (aromatic tetraamino) with a tetracarboxylic dianhydride such as 3,3',4,4'-biphenyltetracarboxylic dianhydride to form a solution. Also, SHERATTE teaches at the abstract forming polybenzimidazoles.

SHERATTE does not specifically teach mixture in phosphoric acid.

But, CHOE teaches at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28 forming a polybenzimidazole with an tetraamino and aromatic carboxylic acid in phosphoric acid. Additionally, CHOE teaches at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28 the phosphoric acid acts as a catalyst. Therefore, it would have been obvious to one



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of ordinary skill in the art to provide the phosphoric acid of CHOE in the mixture of SHERATTE for the benefit of catalyzing the reaction.

Inherently, the phosphoric acid of CHOE does not contain any polyphosphoric acid, since CHOE does not describe at column 7 lines 27-47 and example 1 the addition of polyphosphoric acid.

In the alternative, KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph “Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present.”

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK with the process of SHERATTE, for the benefit of catalyzing the reaction as taught by CHOE at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28.

Also for instant claims 24 and 34, SHERATTE teaches at the abstract, table 1, column 6 lines 54-57, column 9 lines 20-45 and example 5 heating of the solution at 215 °C to form the polymer. The temperature of 215 °C is within the claimed range of upto 350 °C, thereby providing a prima facie case of obviousness.

Additionally for instant claims 24 and 34, SHERATTE teaches at claim 1 and 5 the polybenzimidazole polymer in the form of a film.

As well for instant claims 24 and 34, SHERATTE teaches at the abstract, table 1, example 5 and 8 after forming the polybenzimidazole the polymer was dissolved in ethylene glycol (i.e. treatment of the membrane formed).

In relation, MPEP 2113 describes the following...

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

24. Claims 23-25, 33 and 34 rejected under 35 U.S.C. 103(a) as being unpatentable over CHOE (US 4,312,976) in view of WADHWA et al. (US 5,017,681) or, in the alternative, under 35 U.S.C. 103(a) as obvious over CHOE (US 4,312,976) in view of WADHWA et al. (US 5,017,681) and KIRK-OTHMER (Kirk-Othmer Encyclopedia of Chemical Technology) (“KIRK”).

For instant claims 23-25, 33 and 34, CHOE teaches at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28 mixing 3,3',4,4'-tetraaminobiphenyl (aromatic tetraamino compound) with isophthalic acid (aromatic dicarboxylic acid) and conducting the polymerization with phosphoric acid to form a dispersion.

Inherently, the phosphoric acid of CHOE does not contain any polyphosphoric acid, since CHOE does not describe at column 7 lines 27-47 and example 1 the addition of polyphosphoric acid.

In the alternative, KIRK (PHOSPHORIC ACIDS AND PHOSPHATES) states at page 680 last paragraph – page 681 first paragraph “Phosphoric acid solutions up to a concentration equivalent of about 94%  $\text{H}_3\text{PO}_4$  (68%  $\text{P}_2\text{O}_5$ ) contain  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present.”

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a the phosphoric acid solution containing  $\text{H}_3\text{PO}_4$  as the only phosphoric acid species present of KIRK with the product by process of SHERATTE, for the benefit of catalyzing the reaction as taught by CHOE at the abstract and column 7 lines 27-47 and example 1 and claim 15 and claim 28.

Also for instant claims 23-25, 33 and 34, CHOE teaches at column 6 lines 20-26 heating the dispersion at a temperature of within the range of

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approximately 340 °C to 450 °C to form polybenzimidazole (polyazole polymer).

The range of approximately 340 °C to 450 °C overlaps the claimed range of up to 350 °C

In the alternative, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, see ***In re Malagari*, 182 U.S.P.Q. 549; *In re Wertheim* 191 USPQ 90 (CCPA 1976).**

For instant claims 23-25, 33 and 34, CHOE teaches at column 8 lines 35-40 polybenzimidazoles produced by the process of the present invention exhibit high heat stability and can be employed in the production of various formed articles, such as fibers, films. Though, CHOE teaches little of the particulars of forming the polybenzimidazole of the process into a film, and WADHWA et al. teaches at the abstract numerous details of the process for producing a polybenzimidazole film. Therefore, it would have been obvious to one of ordinary skill in the art to prepare the polybenzimidazole film of CHOE by employing the process of WADHWA et al.

Moreover for instant claims 23-25, 33 and 34, WADHWA et al. teaches at the title polybenzimidazole film (polymer film which is based on polyazoles).

Also for instant claims 23-25, 33 and 34, WADHWA et al. teaches at the abstract continuously casting the solution upon a support (application of a layer to a support using the polyazole polymer).

For instant claims 23-25, 33 and 34, WADHWA et al. teaches at supports can be stainless steel (i.e. an electrode).

Additionally for instant claims 23-25, 33 and 34, WADHWA et al. teaches at the abstract evaporating a sufficient amount of the solvent to form a self-supporting film in an oven (treatment of the layer until it is self-supporting).

### ***Response to Arguments***

25. Applicant's arguments filed 11 February 2010 have been fully considered but they are not persuasive.

26. Applicant argues at page 19 last paragraph that the 35 USC 112, second paragraph rejection of claim 33 should be withdrawn, since the applicant amended the claims. Respectively, the Examiner does not find this argument persuasive.

27. Applicant argues at pages 20-22 that '552, '210, and '984 requires polyphosphoric acid. Respectively, the Examiner does not find this argument persuasive. Applicant is invited to review the new grounds of rejection, necessitated by amendment, addressing the new polyphosphoric acid limitation.

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28. At page 23, Applicant argues that "Choe discloses that the PBI resin can also be obtained by polymerization with polyphosphoric acid (PPA) (see col. 1, lines 31-44)."

Respectively, the Examiner does not find this argument persuasive. The portion of CHOE that the Applicant is relying upon is the Background of the Invention of CHOE. Since, CHOE makes a distinction by stating "polyphosphoric acid" in the prior art over the "phosphoric acid" of CHOE's invention, then this supports the assumption that the phosphoric acid of CHOE's invention does not contain "polyphosphoric acid."

29. Applicant's arguments with respect to claims drawn to the nonelected invention are moot, since the claims have been withdrawn from consideration.

30. At pages 23, 24, Applicant argues that SHERATTE does not teach a proton conductive membranes. Respectively, the Examiner does not find this argument persuasive.

a. First in response to applicant's arguments, the Applicant does not claim proton conductive membranes. Applicant claims at claim 34, "A proton-conducting polymer membrane."

b. Secondly in response to applicant's argument, the Applicant has not shown that the product-by-process of SHERATTE in view CHOE does not result in the proton-conducting polymer membrane product.

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31. At pages 23, 24, Applicant argues that SHERATTE does not teach PPA-free phosphoric acid. Respectively, the Examiner does not find this argument persuasive.

c. First in response to applicant's arguments, the Applicant does not claim "PPA-free phosphoric acid."

d. Secondly in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

32. At pages 26, Applicant argues that WADHWA does not teach a proton conductive membranes. Respectively, the Examiner does not find this argument persuasive.

e. First in response to applicant's arguments, the Applicant does not claim proton conductive membranes. Applicant claims at claim 34, "A proton-conducting polymer membrane."

f. Secondly in response to applicant's argument, the Applicant has not shown that the how or why the "polybenzimidazole film" taught by WADHWA et al. at the title is not a proton-conducting polymer membrane.

33. At pages 26, Applicant argues that WADHWA does not teach PPA-free phosphoric acid. Respectively, the Examiner does not find this argument persuasive.

g. First in response to applicant's arguments, the Applicant does not claim "PPA-free phosphoric acid."

h. Secondly in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

34. Applicant makes a general argument at page 27 that that the examiner's conclusion of obviousness is based upon improper hindsight reasoning. In response to applicant's argument Applicant has failed to show where any specific improper hindsight reasoning occurred.

### ***Conclusion***

35. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the



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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY SHUMATE whose telephone number is (571)270-5546. The examiner can normally be reached on M-Th 9-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Marcheschi can be reached on (571)272-1374. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/A.S./

Examiner Art Unit 1797

/Jason M. Greene/

Primary Examiner, Art Unit 1797